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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/397,814	09/17/1999	ZHONG-CHENG HU	12610-0450	9259

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EXAMINER

METZMAIER, DANIEL S

ART UNIT	PAPER NUMBER
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1712

DATE MAILED: 06/14/2002

21

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 24 31

09/397.814

Applicant(s)

HU, ZHONG-CHENG

Examiner

Daniel S. Metzmaier

Art Unit

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 04 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-10, 12-48, 50 and 51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-10, 12-48, 50 and 51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other _____

DETAILED ACTION

Claims 1-10, 12-48, 50-51 are pending in the instant application. The extension of time and the Continued Prosecution Application (CPA) request filed March 4, 2002 has been entered as Paper No. 18 and 19. Claims 1, 12, 17, 22 29-30, 34, 40, 43 and 50 have been amended by the amendment filed March 4, 2002, Paper No. 20.

Continued Prosecution Application

1. The request filed on March 4, 2002, Paper No. 19, for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/397,814 is acceptable and a CPA has been established. An action on the CPA follows.

Response to Amendment

2. Basis for the volume ratios now set forth in the claims may be found at page 19, lines 15 and 16.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-10, 12-48 and 50-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-10 and 12-33 are indefinite because the limitation less than about 90°C is not adequately defined. The claims and the specification do not specifically define how the skilled artisan should interpret the modifier "about". See MPEP 2173.05(a) and

Amgen, Inc. v. Chugai Pharmaceutical Co., 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir. 1991).

In claims 1-10, 12-14, 16-21, 34-48 and 50-51; it is unclear what are the metes and bounds of the limitations for time and/or temperature since said limitation is based on desired characteristics and neither the time/temperature or the desired characteristics are set forth in the claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 7-10, 12-18, 22-23, 25-29, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over M. Z.C. Hu et al., "Nucleation and growth for Synthesis of Nanometric Zirconia particles by Forced Hydrolysis", J. of Colloid and Interface Science, 198:87-99 (1998)¹. M. Z.C. Hu et al (page 88, Materials and Method et seq) discloses methods of making nanoparticles by mixed solvent nucleation and growth of zirconia particles.

Hu et al differ from the claims in the temperature range for the hydrolysis or a single process employing the temperature and solvent to water ratios.

¹M.Z.C. Hu et al. was published in February 1998 in vol. 198, No. 1 of J. of Colloid and Interface Science and therefore has a publication date which qualifies its date as prior art under 35 USC 102(b).

Hu et al (page 95) teaches the relationship between effective hydrolytic diameter and temperature for particular systems including a temperatures of 90° C for incubation. Specifically, the particle growth rate increases with increasing temperature.

Hu et al (pages 97 and 98, Figures 13 and 14) teaches a 1/1 volume ratio of organic solvent to water. Hu et al (page 98, Summary) recognizes the relationship between reaction rate and particle morphology including cubic versus spherical shape and microstructure including crystalline versus amorphous structure and rate adjusting factors including salt concentration, reaction temperature, and system additives including cosolvents that stimulate particle-particle coagulation.

The instant claims read on the 1/1 ratio and only differ from the 90° C disclosed in Hu et al by fractional amounts. Hu et al specifically teaches varying the reaction parameters for the advantage of particle production efficiency. It would have been obvious to one of ordinary skilled in the art at the time of applicants invention to vary the temperatures around those disclosed in the Hu et al reference by at least fractional amounts and/or vary the other rate adjusting factors including the addition of solvents and/or the concentrations of salts for the advantage of particle production efficiency.

7. Claims 4-6, 21, 24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over M. Z.C. Hu et al., "Nucleation and growth for Synthesis of Nanometric Zirconia particles by Forced Hydrolysis", J. of Colloid and Interface Science, 198:87-99 (1998). as applied to claims 1-3, 7-10, 12-18, 22-23, 25-29 and 31-32 above, and further in view of Y. T. Moon et al., "Preparation of Monodispersed and spherical

Zirconia Powders by Heating of Alcohol-Aqueous Salt Solutions", J. Am. Ceram. Soc., 78(10): 2690-2694 (1995).

Hu et al further differs from the claims in the further addition of a dispersant and the ratio of solvent to water.

Y.T. Moon discloses methods of making monodispersed ZrO_2 from zirconyl chloride solutions. Moon (page 1103) discloses 0.2M salt solution, R/H (alc/water vol. Ratio) ranges from 2 to 5. Figures 2 and 3 clearly show temperatures within applicants range of claims 13 and 14. Moon (micrographs, Fig 4-6) show nanosized particles. Moon (page 2693) discloses the dispersant is absorbed on the particles during particle growth. It is concluded the dispersant is added prior to or during incubation and would be absorbed at any time prior to the conclusion of particle growth, which would inhibit or stop particle growth and therefore incubation.

These references are combinable because they teach formation of nanosized particles and Moon is cited in Hu (15). It would have been obvious to one of ordinary skilled in the art at the time of applicants invention to add the dispersant after the conclusion of the incubation since it inhibits of agglomeration and further growth of particles. Moon teaches the RH ratio as conventional in the art. Variation thereof would have been obvious to one having ordinary skill in the art at the time of the invention.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11

F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims ⁴³~~42~~-48 and 50-51 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,264,912. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims broadly encompass the patented claims and are open to further process steps by the use of the claim language "comprising".

Allowable Subject Matter

10. Claims 19 and 20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Applicant's arguments filed March 4, 2002 have been fully considered but they are not persuasive.

12. Applicant (page 5) asserts the Moon article requires microwave heating to obtain their particles and directs attention to Table 1. While the Moon article does employ microwave heating, it discloses said processes wherein the particles are microwave

heating rate of 120°C/min and a temperature of heating to 80.3°C as shown in figure 4. A temperature of 80.3°C is less than about 90°C as claimed and the claims do not exclude microwave heating.

13. Applicants have amended the claims by the insertion of the phrase "wherein the sol or the gel is capable of forming a coating". The methods of Moon anticipate those instantly claimed. It is therefore reasonable to conclude the intermediate sols and/or gels are inherently capable of forming a coating.

Furthermore, applicant (page 1, lines 14-26) discloses sol-gel processing is known and sol-gel processes produce coatings and films. Applicant has not shown the limitation of the properties of the intermediate composition as capable of forming coatings imparts any patentable distinction to the claimed methods. Attention is directed to MPEP 2112 and the accompanying case law. It is noted that a composition, more to the point a composition recited as an intermediate in a method of making a monodispersed particle, does not become patentable because of a newly discovered property of said composition.

Lastly, the capabilities of the Moon materials would have at least been implicit to those having ordinary skill in the art at the time of the invention as a conventional method of forming ceramic precursors disclosed in the Moon reference to be later sintered.

14. Applicant (page 5) argues the instant invention is directed to powders as well as sols and gels. Applicant's arguments are not clear since the Moon reference is applied only to the methods of making monodispersed particles. Applicant's arguments may be

interpreted as an admission that the sols, gels, and dried particles are obvious one over the others. Please clarify.

15. Applicant (page 5) asserts he does not employ microwave heating. This has not been deemed persuasive because the claims do not exclude microwave heating. While applicant does not expressly claim or exclude microwave heating, the incubation step is carried out at a temperature of less than about 90°C. A majority of the examples are incubated at 90, 100 and 120°C. While examples 11 and 12 are directed to room temperature methods, examples 1-10 and 13-18 are directed to processes at elevated temperatures and the examiner is unable to find any disclosure of the type of heating employed therein. It can not be reasonably concluded the claimed methods would not read on microwave heating as disclosed in the Moon reference.

16. Applicant (page 5) assert the materials formed by the claimed process are capable of forming as coating because Moon fails to mention sols or gels. Applicant refers to the intermediates rather than the powder materials formed in the claimed methods of claims 43-48 and 50-51. Applicant's arguments are not commensurate to the claims since the claims are otherwise indistinct from the method steps claimed in 43-48 and 50-51 for making a powder rather than a sol-gel coating asserted.

As applicant knows, a sol is discrete units (colloidal²) of solid dispersed in a liquid. Please see page 9, line 4, of the instant specification.

Applicant's new limitation is given little or no patentable weight because: (1) the methods are otherwise the same, (2) applicant recognizes at page 1, lines 14-26.

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particularly 24-26; that sol-gel processes are known to be used in forming coatings and films, and (3) the potential utilities of the intermediates do not impart patentable distinction to an otherwise known method.


17. Applicant (pages 5 and 6) asserts claims 44-48 and 50-51, which are dependent on claim 43 are allowable because of the previously presented arguments. Said arguments have been addressed above and the rejection over the Moon article is deemed to be proper over the claims as amended.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Metzmaier whose telephone number is (703) 308-0451. The examiner can normally be reached on 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Dawson can be reached on (703) 308-2340. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Daniel S. Metzmaier
Primary Examiner
Art Unit 1712

DSM
June 3, 2002

² Please compare and contrast with a suspension, which is a non-colloidal particulate dispersion, i.e., greater than 1 micron.